

CLAIMS

What is claimed is:

1. An inkjet device for color filters to print conductive ink droplets on a color filter substrate and to equalize distribution the ink droplets, which comprises:

- 5 a print head module having at least one nozzle and each color having a distinct print head for painting ink droplets on the color filter substrate;
- a motion platform supporting the color filter substrate so that the substrate being able to have a relation motion with respect to the print head module;
- 10 an electric field generator imposing an electric field on the filter substrate with printed ink to produce the electrocapillary effect so as to equalize distribution the ink droplets;
- an optical detection system detecting the relative positions of the color filter substrate and the nozzles; and
- 15 a control system controlling the print head module, the motion platform, the electric field generator and the optical detection system.

2. The device of claim 1, wherein the optical detection system detects a border track of a printing frame on the color filter substrate to ensure the relative positions of the filter substrate and the nozzles.

20 3. The device of claim 2, wherein the printing frame is a two-dimensional black matrix.

 4. The device of claim 1, wherein the optical detection system uses a light source under the substrate, detecting the light intensity through the substrate to determine the relative positions of the color filter substrate and the nozzles.

5. The device of claim 1, wherein the electric field generator produces the electric field using an electric current selected from the group consisting of a direct current (DC) and an alternative current (AC).

6. The device of claim 1, wherein the electric field generator includes two electrodes with opposite polarities and the electrodes are installed both directions of the ink droplets.

7. The device of claim 6, wherein one of the electrodes is on one side of the print head module and the other electrode is installed on one surface of the substrate.

8. The device of claim 7, wherein the electrode on one side of the print head module is integrated together with the print head module.

9. The device of claim 8, wherein the electrode on one side of the print head module has a height adjustment unit, which adjusts the electrode and the substrate to change the relative distance between the electrode and the nozzle on the print head module.

10. The device of claim 9, wherein one of the electrodes is installed on one side of the print head module and the other electrode is installed on a bottom surface of the substrate.

11. The device of claim 1, wherein the print head module further comprises a height adjustment unit, which adjusts the relative distance between the print head module and the substrate.

12. An inkjet manufacturing process for color filters to print conductive ink droplets on a filter substrate and to homogeneously distribute the ink droplets, which comprises the steps of:

implanting an electrode on the filter substrate;

forming a printing frame on the filter substrate;

positioning the filter substrate and a nozzle;

discharging ink droplets into printing frame; and

imposing an electric field by the electrode on the ink droplets to equalize distribution the ink droplets.

13. The manufacturing process of claim 12, wherein the electrode is implanted on a
5 surface of the filter substrate.

14. The manufacturing process of claim 12, wherein the electrode is implanted on a bottom surface of the filter substrate.

15. The manufacturing process of claim 12, wherein the filter substrate is further formed with a shielding wall on the printing frame to avoid ink droplet sputtering.

10 16. The manufacturing of claim 15 further comprising the step of removing the shielding wall after the ink droplets discharging onto the color filter substrate.

17. The manufacturing process of claim 12, wherein the printing frame is a two-dimensional black matrix.

18. The manufacturing process of claim 12, wherein the step of positioning the color
15 filter substrate and a nozzle is achieved using a border track of the printing frame.

19. The manufacturing process of claim 12, wherein a curing step is included after the color filter substrate is printed with the ink droplets.

20. The manufacturing process of claim 19, wherein the curing is selected from the group consisting of vacuum, baking and UV curing.